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Inaugural Dissertation

on

Tetanus

Chs. F. Mattack

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Tetanus may be defined an involuntary and almost constant contraction of all or many of the muscles, while the senses remain perfect and entire. It is divided into two species, the symptomatic and idiopathic; the former being induced by wounds or other lesions of the solids, the latter by exposure to cold and other less obvious causes. By nosologists and practical writers Tetanic complaints have been distinguished into Opisthotonos, Emprosthotonos and Trismus, but as only marking different grades of the same disease, little need be said of their distinctions.

Scarcely is there an affection that assails the human system in which the pathology has been more unsuccessfully attempted than in Tetanus. Thus baffled at the outset, practitioners have hitherto directed their attention almost exclusively to an individual symptom, namely, the spasmodic contractions. Hence the inordinate use of opium, æther, the warm bath and every remedy calculated to repress action in the living fibre. The inutility of these remedies alone, one would think, should induce practitioners no longer to repose confidence in their efficacy.

Considering almost the whole of the muscular structure is involved in Tetanus, we are almost intuitively led to refer its seat to the source of motive power. It will be shown in the course of the following dissertation, that the morbid appearances presenting themselves in Tetanus, in those subjects who have been examined after death, tend to substantiate this conclusion.

Within a very few years we have been presented with an essay on this disease by Robert Reid M.D. He classes it with diseases incidental to the spinal system. Before entering into its investigation he lays before us a general view of the principles upon which the classification itself is founded. I conceive it unnecessary to enter into the details of this author, though I have perused them with interest and instruction. It will be sufficient that I give the general outlines of his classification endeavouring to make the subject as compendious as its nature will admit.

Upon inspecting the anatomical structure of man, we observe the nerves distributed into three grand natural divisions. The first supplying the organic viscera of the Thorax and abdomen, which from its peculiar formation is properly called the Ganglionic System by anatomists

The second is enclosed in the bony canal of the vertebral column, and may hence be denominated the spinal system. This distributes its nerves to all the muscular parts of the body.

The third having its centre in the head comes under the name of the cerebral system; to this belong the intellectual powers and the five senses.

Dr. Reid appeals to comparative Anatomy to show that nature seems to adopt this division throughout the various individuals of animated being: some are endowed with the first, others have the second superadded, but man possesses

the three in the highest perfection. Led by these and other considerations which the author has mentioned, while investigating the phenomena of disease, it is obvious that we ought to follow the path which nature points out. He therefore proposes to name diseases under three general heads, which should be named according to the nervous system in which each was principally seated. Alluding to the analogy which at first view might seem to exist between this distinction of the functions and that of the Vital, Animal and Natural functions, he shows the objections to the latter arrangement and then points out the difference between it, and the one proposed. In favour of a classification of diseases, according to the principles before stated, we obtain a clearer view of the balance of activity, which is necessary to constitute health. This view may be confined to definite limits, when we observe, that although the balance may be deranged, in a particular organ only, or even a part of an organ of one system, yet when weighing it, with regard to the others, the whole of the diseased system, must be taken into consideration.

When however we contemplate the operation of the different systems which constitute the human frame, we will perceive that each system is formed by nature to perform certain functions in the animal economy. But they are so intimately connected, with each other when conspiring to support the animal body as one whole and entire system, that the functions of any one cannot be interrupted, without

having some influence upon the rest. The effect of this influence then must be, to excite or repress the actions of the different organs. We will find however in the investigation of diseases, that the systems which are not immediately engaged in the morbid state, will take on actions, which are not only capable of resisting the effect of disease upon themselves, but often prove salutary, by restoring the healthy balance of activity, throughout the whole. This tendency then is the long celebrated Vis medicatrix Naturæ, which we are enabled to point out with ~~so much~~ precision, and support or excite, during the treatment of diseases, by considering the operations of the animal frame, according to the classification which is now proposed. If we could discover any property peculiar to a nervous system, which cannot be present when such nervous system is absent, and must therefore be essential to its perfection, it is evident that any disease affecting that nervous system, must be indicated by a modification of that property. Hence then to form any certain diagnosis of diseases, we must know what essential property of the nervous systems, is primarily and principally affected in each. When we consider that each system of nerves, is distributed to certain parts of the animal frame, and then performs an exclusive function, although the three systems are held in reciprocal communication; by pointing out, clearly, the functions which each has to perform, in the healthy state, we will find little difficulty in appropriating a derangement of any part of those functions, to its proper class.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] that the [illegible]

above that the [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Medical Journal

In the first [illegible] I could not [illegible] could

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Without entering [illegible] I shall attempt to show [illegible] the morbid [illegible] of this lesion, [illegible] the disease.

In appearance [illegible] is the [illegible] connecting the [illegible] the [illegible] of the [illegible] and the [illegible] vertebrae. The part of the spine [illegible] the [illegible] is [illegible] and [illegible] vertebrae or the [illegible] or the back [illegible] It is [illegible] in experience [illegible] who is not all [illegible] with that [illegible] which [illegible] within feeling of [illegible]. It [illegible] in the [illegible]. The skin being [illegible] the [illegible] the skin under consideration, the weight of the [illegible] the [illegible] most [illegible] at this spot. The [illegible] and the [illegible] is [illegible] to [illegible] at the [illegible] under the [illegible] of tetanic action. Nearly the same may be said of the union between the last cervical and first dorsal vertebrae, which constitutes [illegible] to form a [illegible] the third kind. The upper dorsal vertebrae [illegible] assume the [illegible] the distance, and the muscles [illegible] extension the lower region. From [illegible] pressure

[illegible] sensibility in the side [illegible] on the first dorsal vertebra. Even in tetanus, especially of the opisthotonos kind, the operation of force [illegible] would be [illegible] to be very [illegible].

It must be left to future observers to decide whether the morbid appearances in tetanus are [illegible] and of the power mentioned. Dupuytren's dissections of the spinal marrow of those destroyed by tetanus are not [illegible]. He has published [illegible] observations, which prove that morbid appearances have been observed in the nervous system [illegible] that part in tetanus [illegible] the disease of tetanus.

From the morbid appearances just enumerated it seems evident that the disease is of an inflammatory nature. It would also appear that its principal seat is in the membranes investing the nervous marrow or the spinal [illegible]; for we [illegible] the peculiar characteristic of membranous inflammation, in the remarkably [illegible] state of the vessels of the part.

It [illegible] that when it [illegible] the patient before the third day [illegible] other time will be the most [illegible] [illegible] may [illegible] expect to [illegible] when the disease is [illegible] intermittent.

it may be a curious circumstance that we can produce this disease by artificial means. for when an animal has been decapitated, if we instantly introduce a stilet [illegible] into the spinal [illegible] [illegible] that nervous system, without [illegible] completely the [illegible] the [illegible], we immediately throw into that [illegible] [illegible] [illegible] Tetanus.

I have myself [illegible] [illegible] [illegible] such experiments on the [illegible] cat by cutting down [illegible] the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

Causes of Tetanus

[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] predisposition to the disease [illegible] [illegible] [illegible] [illegible] it.

[illegible] [illegible] of the body to the [illegible] of [illegible] the agent most to be the most general, [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] climate that [illegible] [illegible] [illegible] [illegible] the [illegible] [illegible] [illegible] [illegible] [illegible] to the [illegible] [illegible] the [illegible]. [illegible] [illegible] [illegible] circumstance that the [illegible] in [illegible] [illegible] [illegible] with [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] other [illegible]. It [illegible] upon strange that the [illegible] of the southern climate [illegible] [illegible] predisposing cause, when we observe that Tetanus is so very rare a disease among [illegible] [illegible] [illegible] [illegible] influence. But when we reflect upon the nature and habits of the two professions, we may in

[illegible] to [illegible] the [illegible] [illegible] [illegible]

[illegible]

[illegible]

[illegible]

A violent [illegible] under the nail has been known to excite Tetanus.

It is Dr. Reid's opinion that [illegible] Tetanus never arises from [illegible] derangement of internal organs. He has been [illegible] to find one case [illegible] of true Tetanus which arose from [illegible] [illegible] [illegible] [illegible]. [illegible] Tetanus therefore from the [illegible] arising from [illegible] [illegible] [illegible] [illegible] the symptoms [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] it was [illegible] [illegible] [illegible]. . . . But are these [illegible] the [illegible] of the [illegible] [illegible] in the [illegible] different in kind from the [illegible] from the acknowledged causes of Tetanus? [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]*. I shall [illegible] to speak of this when considering the [illegible] Tetanus.

Prognosis

"Tetanus has been observed in [illegible] [illegible] [illegible] when [illegible] from a [illegible] [illegible] [illegible] [illegible] [illegible] is even possible [illegible] to tell the approach of Tetanus in the [illegible] the wounded part. [illegible] seen that when the [illegible] from the wounded part [illegible] [illegible]

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* [illegible]

of that inflammation which is necessary to account [illegible] [illegible]. The same [illegible] happens with inflammations situated in any part of the body. tumours will often diminish or disappear altogether previous to the appearance of the disease."

Do not the [illegible] facts [illegible] to show that there is a metastasis of inflammation to the spinal marrow?

Since the [illegible] [illegible] [illegible] [illegible] each other and are [illegible] [illegible] [illegible] [illegible] that the disease is more dangerous [illegible] that [illegible] [illegible] altered.

[illegible] that the inflammation [illegible] of the spinal marrow [illegible] the tendency [illegible] of the tumours [illegible] [illegible] to its commencement. It has been [illegible] [illegible] that some medical [illegible] [illegible] [illegible] back the inflammation [illegible] [illegible].

Treatment;

Whatever [illegible] cause of this [illegible] [illegible] will be [illegible] [illegible], then [illegible] resorting to those [illegible] were calculated [illegible] by depressing the powers of the system but finding the [illegible] often [illegible] hand,

many innovations were introduced into the treatment of Tetanus. Almost every variety of treatment however [illegible] it has hitherto been lauded, when contrasted with that which a more correct pathology offers us, must sink highly in our estimation.

Dr Reid [illegible] states that the distension which occurs from an internal irritation should not be regarded as a sure guide of true Tetanus; but the distinction which is offered is rather unimportant and futile. Indeed he speaks of Trismus [illegible] as it always confines to the jaw alone. Although its etymology may thus admit the objection, practical writers tell us that it not only affects the jaw which is rigid and fixed, but in some cases it extends to the neck and trunk which is also bent back. The distinction [illegible] of small consequence yet the distinction [illegible] value. The opinion is weakened by the fact that certain poisonous substances when taken into the stomach in certain quantities will induce Tetanus [illegible] before mentioned.

Considering the nature of our disease, Tetanus [illegible] indications [illegible] though [illegible] the [illegible] has been without [illegible]. It is evident that [illegible] preference should be given to the [illegible] in this place should be [illegible]

in which case I have occasion to see effusion and [illegible] [illegible] [illegible] in them. These pains are in the [illegible] of the [illegible] cervical and first [illegible] vertebrae ~ of the [illegible] cervical and first dorsal. [illegible] [illegible] [illegible] [illegible] in [illegible]. [illegible] [illegible] becoming [illegible] the [illegible] nervous system of the [illegible] affected; [illegible] [illegible] the [illegible] that [illegible] diminished [illegible] [illegible] [illegible]. [illegible] [illegible] on the nervous system of the brain [illegible] the [illegible] by [illegible] blood it is evident we weaken one of the most [illegible] to the morbid action and thus [illegible] [illegible] the general destruction. [illegible] [illegible] general blood letting I [illegible] [illegible] cannot extend to its [illegible] employment [illegible] [illegible] conducted.

[illegible] [illegible] [illegible] it has been the practice to [illegible] to bring back inflammation to the part [illegible] stimulating applications, such as the actual cautery, oil of turpentine [illegible] [illegible] [illegible] Dr. Stephenson of Baltimore in the [illegible] [illegible] in the [illegible] of the American [illegible] Physician [illegible] p. 12.

As the disease is seated in the spinal canal it is obvious that external inflammation [illegible] [illegible] in [illegible] [illegible] vicinity to the seat

of the [illegible] to expect some [illegible] from [illegible] [illegible] [illegible]

[illegible] being the cause of this disease. Indeed so great derangement has been often observed in the sanguiferous viscera, after this disease that many have been led to think that Tetanus was entirely [illegible] in the morbid state of some of these organs. Thus Mr. Abercrombie advises that the seat of the disease should be looked for in the stomach. He [illegible] attention, to the state of this organ [illegible] treatment of tetanus.

I might add to the names of the [illegible] that Dr. Hamilton refers to the [illegible] as being the cause of the disease. In conjunction with Mr. Abercrombie Dr. Hamilton refers the seat of this disease to the stomach. The morbid appearances then observed were somewhat in accordance, which induces them to refer the cause to the important organ above mentioned.

The principal sensation under the sustern cartilage corresponding to the opening of the stomach seems to have induced Dr. Hamilton to refer the seat of tetanus to this viscera. As this symptom requires publication, it may not be improper to mention the use of a mixture of laudanum and ether as an embrocation to the part, in Dr. Ewart's simplest form: it afforded great relief in his cases. When tenderness should be felt on the part rub down with the hand to prevent irritation of the other.

[illegible] the [illegible] of [illegible] [illegible] [illegible]

[illegible] the attacks of the disease [illegible] in length. [illegible] [illegible] [illegible]

[illegible]

[illegible]

[illegible]

The curative action of stimulants [illegible] experience [illegible] benefit.

Dr. Reid recommends the use of sudorifics from their [illegible] conjunct [illegible], which may not be [illegible] satisfactory. Indeed the view which I take of their curative action is entirely different.

When we consider that the [illegible] to excess [illegible] combined with [illegible] excitement [illegible] that most generally the effect of such exertion is [illegible] we may conclude that when [illegible] occurs in disease that the energy of the nervous system of the brain must be weakened. This opinion is [illegible] the fact that no disease is attended with greater debility than that accompanied with this symptom in excess. Then as this disease is the extreme of action in this system which would become paralysis if the effusion on the membranes investing the nervous mass, were to amount to compression, it is evident one principal object in the treatment of [illegible] should be to weaken its energy. To procure free and copious perspiration, would appear the most efficacious method of accomplishing this end."

"In the continued powder of Ipecacuanha we have a preparation, very powerful for this purpose. For by this combination the whole force of the opium, which is supposed so powerful in this disease, is directed to the proper point. The efficacy of this mode of treatment is abundantly

conspicuous in the excitement and on some occasions the disease in question?

"If the [illegible] treatment [illegible] [illegible] [illegible] would [illegible] [illegible] [illegible] [illegible] by the intervening obstruction. It has been shown in describing the symptoms of the disease that the brain [illegible] [illegible] [illegible] to resist its influence; we should therefore support the system in the due performance of its functions by stimulants proportionate to the necessity of the case; not however to urge them by over measure so far, as to induce the contrary effect.

There would at first view appear an obvious inconsistency in a medicine which [illegible] this disease [illegible] [illegible] effection; but from what has been said we may infer that in proportion as we raise the energy of the brain to a certain degree, we repress the action of the spinal system in Tetanus. Experience, however, proves that some doses than are that the well attending this [illegible] of information if it succeeds at all, bears no comparison with the benefit of exciting the energy of the brain. Nay, the action we induce in the cerebral system opposes morbid action in the other.

Medicinal wine, is by far the best stimulant that can be employed to support the energy of the cerebral system in tetanus. This may be given

[illegible] the [illegible] [illegible] [illegible]

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With it, we have a code of principles in perspicuous language before us: we can resolve the many forms of treatment which have been empiricly used, into the deductions of science.

But the treatment of disease will ever demand the exercise of a discriminating judgment, which science indeed may enlighten, but which experience alone can perfect.

When we find the experience of the wise and the circumspect, to differ but little from the deductions of pathology we are safe; we have at least a test of the soundness of that pathology.

I am indebted it will be observed to the labours of Dr. Reid for a large portion of what has been advanced. I have not quitted my subject however, without attempting some illustrations. His classification of diseases, together with his pathology and treat-ment of Tetanus I have adopted — The classification itself cannot give rise to any mischief when applied to practice, but is well calculated to facilitate our researches into disease and to point out the indications to be pursued.